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ABSTRACT

A review of research concerning the nature of text organization skills that contribute to reading comprehension ability reveals two distinct categories of studies: (1) those in which texts have been manipulated so as to facilitate spontaneous syntactic-semantic organization by the reader, and (2) those in which readers have received training or instructions to process unaltered texts in a manner presumed conducive to improved comprehension. Studies in both categories suggest that the degree of organization imparted to a text during input processing is an important variable in reading comprehension. (Author/FL)

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ABSTRACT

This paper reviews research on text organization in reading comprehension. Two categories of studies are considered: those in which texts have been manipulated so as to facilitate spontaneous syntactic-semantic organization by the reader, and those in which readers have received training or instructions to process unaltered texts in a manner presumed conducive to improved comprehension. Studies in both categories suggest that the degree of organization imparted to a text during input processing is an important variable in reading comprehension.

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COMPREHENSION SKILLS AND TEXT ORGANIZATION ABILITY IN READING

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In a recent paper Perfetti stated, "the cognitive part of Reading Comprehension = Language Comprehension + Decoding + X, and, more importantly, . . . X is small relative to the other two factors" (1977, p. 20, author's emphasis). Perfetti's research orientation is to ignore "factor X" and focus on language comprehension and decoding in his attempts to understand the development of reading comprehension ability. This approach exemplifies a decoding sufficiency view of reading comprehension development: For children who exhibit no difficulty comprehending oral language, ability in reading comprehension is basically dependent upon mastery of decoding skills.

An alternative view is that ability in reading comprehension develops through mastery of a number of skills, including decoding, that are specifically required in reading and are supplementary to skills previously acquired in oral language comprehension. In this comprehension skills view (Coots & Snow, 1980), Perfetti's factor X is regarded as critical to the development of comprehension ability. It references reading comprehension skills that are not encompassed by decoding. These additional skills function to organize printed text during reading.

Inability to organize text into units of meaning at the multiword level has been identified as a characteristic of poor comprehenders (Golinkoff, 1975-76). Regardless of ability in decoding, poor

comprehenders are typically word-by-word readers who show little skill at synthesizing meaning across words. In this paper we explore the nature of text organization skills that contribute to reading comprehension ability. We examine the effects of various experimental manipulations designed to improve reading comprehension by means other than direct training of oral language skills or decoding skills. Experimental treatments will be considered in two groups: Those that involve manipulations of texts, and those in which the reader's behavior is modified directly.

Effects of Text Manipulations

Wiener and Cromer (1967) argued that some poor comprehenders appear to possess adequate basic skills in reading but inappropriate "response patterns" for creating meaning from texts; e.g., they fail to respond to the task as reading-for-meaning. One remedy for such "difference" poor readers is to alter texts so they encourage appropriate processing strategies. The effectiveness of this approach was demonstrated in a study reported by Cromer (1970). When difference poor comprehenders read texts in which phrases had been separated from one another by extra spaces between phrase boundaries, they performed as well as good comprehenders on subsequent multiple-choice comprehension questions. On nonsegmented or normal texts, however, difference poor comprehenders performed more poorly than on phrasally segmented texts, and more poorly than good comprehenders. The phrasal segmentation apparently provided the kind of text organization which these poor readers were not capable of generating on their own.

The choice of the phrase as the unit of segmentation was based upon the need to present texts in minimal, meaningful, multiword units. That is, since poor comprehenders seem to organize text only word-by-word, preorganized units had to consist of more than single words if they were to facilitate comprehension at higher levels of discourse meaning. It was also necessary that the segmented units be meaningful; that the words within the units "seem to make sense and to go together." Finally, the segmented units had to be small enough not to overwhelm the reader with information. The phrasal unit satisfies these conditions.

Dividing texts into phrases, then, provides a form of organization by grouping words that belong together semantically. This operation is supported by findings in memory research and speech production studies. Anglin and Miller (1968) provided a clear demonstration of the power of phrasal grouping in a verbal memory task. College students were asked to read and recall two paragraphs. Both paragraphs were segmented, and the segments were presented individually for 2-second exposure in a memory drum. In one case the segments consisted of phrases; in the other, the segments were created by dividing the text two words prior to the phrase boundaries. Participants read each paragraph aloud six times, segment-by-segment, and wrote down "word-for-word" all they could remember at the end of each reading. Phrasal segmentation led to the recall of a significantly greater number of words on each trial. "We interpret this result as supporting the psychological validity of phrase structure" (Anglin & Miller, 1968, p. 344). If it is assumed that differences between the segmentation formats had no effect on

decoding for these college students, then the recall difference must be attributed to factors other than decoding. To the extent that these organizational factors influence comprehension of text as well as its recall, then reading comprehension is affected by segmentation variables.

Based on the observation that pauses in speech occur at grammatical junctures between sentences, clauses, and phrases, Grosjean, Grosjean, and Lane (1979) undertook an intensive study of the relationship between pause durations and sentence structures. College students were asked to read sentences at various speeds from one-fourth of normal to three times normal. The durations of silence between words were used to determine whether the performance structures of sentences were the same as or different from their linguistic surface structures. Results showed that variations in pause duration could be used to obtain complete hierarchical performance structures for sentences, and that these structures were similar to those obtained by other performance measures and by linguistic analysis. Furthermore, when subjects were asked to parse the printed sentences, the resulting structures were the same as in the analysis of pauses.

The Grosjean et al. (1979) results suggest that pauses serve to organize speech output into meaningful constituent units. Such pauses probably help the listener to organize speech during the process of comprehending oral language. It is likely, then, that segmentation of visual input, or other operations that function analogously to pauses, may help to organize text during reading comprehension as well. The psychological validity of phrase structure in speech production and in

visual language reception implies that phrase structure is a general organizational feature of language processing.

A number of segmentation and formatting studies have been conducted in attempts to improve the typography of texts. Such studies are not typically concerned with differences between good and poor comprehenders, or with improving the comprehensibility of texts for poor comprehenders per se. They tend to involve adult subjects whose reading ability can be assumed to be at or above average. Nevertheless, typography studies offer a source of valuable information about relationships between text presentation variables and reader performance variables related to comprehension.

Carver (1970) measured reading time and accuracy on post-questions to evaluate the effectiveness of texts segmented into long (3-10 words), medium (2-5 words), or short (1-3 words) chunks, with segments displayed either on individual lines (vertical) or on the same line but with extra space between them (horizontal). When these segmented formats were compared with normally paragraphed text, college subjects were fastest on the conventional format, but there were no significant differences among formats on the comprehension measure. When asked to rank the formats, participants clearly preferred the medium vertical display, as in the following example:

> Assuming that the physical
> and moral well-being
> and the stable social order,
> which are the indispensible conditions
> of permanent industrial development,
> are secured,
> . . .

These results failed to support Carver's hypothesis that dividing printed text into informational chunks would improve reading efficiency

and/or reading comprehension. However, Carver was careful to point out that "these results do not necessarily imply that certain types of readers (e.g., those with perceptual difficulties, or those very slow, or children who are still learning to read) will not benefit from chunking" (1970, p. 296).

Graf and Torrey (1966) did find a significant facilitative effect upon reading comprehension using a format that conformed to the medium vertical guidelines. However, the advantage was not realized in comparison to conventional text. Graf and Torrey's facilitative text segments consisted of phrases, as did Carver's text segments (see example above). The comparison text was also segmented, but the chunks were designed to impede rather than facilitate comprehension. They were formed by shifting the breaks one word to the left of phrase boundaries. Thus, each line of text contained information from two adjacent phrases. College readers comprehened the phrasal text significantly better than the fragmented comparison text.

Graf and Torrey's procedure included two operations that impose caution on generalization of results. First, only one segment of text was visible to the reader at a time. This procedure introduced a memory factor in the integration of information across segments. Second, the segments were presented at a pace that was predetermined to be slightly too fast to allow full comprehension of the passage for each participant. Both conditions are considerably different than those encountered in normal reading.

Wendt (1979) asked German students ages 12-15 to study a chapter in a physics text presented in one of four possible formats. The

normal column (126 mm wide) and double column (58 mm each) formats represented standard typography. A phrasal segmentation format used horizontal display of adjacent phrases, with double or triple spacing between phrases to reflect psychological/semantic distance ("proportional spacing"). Finally, a visualized layout format departed from conventional text in the entire organization and display of the text material. A 20-item test given before and after reading failed to reveal any differences across formats. The Wendt results do not favor departures from the normal 126 mm columnar format.

Frase and Schwartz (1979) examined the effects of phrasal segmentation and indentation on reading comprehension by asking adults to verify information in complex technical passages. Segments were displayed vertically with variations in indentation to distinguish continuity and subsumption relations, as in an outline. Results showed that segmented and indented text produced 14% - 18% faster response times than conventional text. The factor primarily responsible for the improvement was segmentation; the addition of indentation as an organizational cue did not produce a significant increase. In their discussion, the authors observed:

> Our theoretical position states simply that mature reading operates on separable groups of meaningful clauses. When there are incomplete phrases in lines of a text, there are concomitant hesitations in the flow of information processing.
>
> Our results show that lines may be short or they may be long, a page may have neat margins or ragged margins. No matter. What is critical is whether the lines represent meaningful groups of information (1979, p. 205).

The most inventive segmentation procedure that we have encountered was reported by Martin, Meltzer, and Mills (1978). Sentences were revealed one syllable at a time on a TV monitor until the entire sentence was displayed to the reader. The novelty is that the pace of visual syllable exposures was yoked to the temporal pattern of oral speech. In other words, sentences grew visually at the same rate and pattern as they grew orally. This "visual rhythm" procedure can operate either with or without output accompaniment on the auditory channel.

In an early study (Martin & Meltzer, 1976), remedial readers in grades two to four demonstrated improvement in reading fluency after three 10-minute training sessions using the visual rhythm technique. Control subjects showed no improvement after equal training time using the same materials, but with conventional visual displays. Martin et al. (1978) found the same facilitating effect of the visual rhythm procedure on the reading fluency of high school students in a second language. Since reading fluency depends on the reader's ability to process words in semantic units, it is reasonable to conclude that visual rhythym training had beneficial effects on comprehension as well. This is an interesting technique that makes direct use of the temporal segmentation features of speech to enhance the comprehensibility of written language. It apparently allows the reader to transfer timing skills from speech processing to the comprehension of print. If so, it represents a potentially powerful device for development of literacy skills.

Text segmentation procedures have also been used to study decoding skills. Mathews, Coon, and Rosenthal (1980) attempted to evaluate the degree of decoding automaticity among students in grades 1-6. They reasoned that placement of differential processing loads upon decoding skills would lead to different rates of reading across children who varied in comprehension ability.[1] Processing load was manipulated by employing four different levels of segmentation: regular--one space between words; word--20 spaces between words; syllable--20 spaces between syllables, 40 spaces between words; letter--20 spaces between letters, 40 spaces between words. All formats used triple spacing between lines.

A stepwise multiple regression was performed to predict four reading subscores on the Stanford Achievement Test from oral reading times on the four segmentation formats. In grades 1-3, reading comprehension scores and word study scores were predicted well by the combined performances on the segmentation formats. Vocabulary and listening comprehension scores were predicted well at only the first grade level. Arguing that reading comprehension and word study skills depend on decoding ability more than do the other two variables, the authors suggested that decoding skills "reach maturity or 'automaticity' . . . by around the fourth grade. Thus, reading times beyond the fourth grade would no longer reflect a significant component of the variability in reading scores . . ." (p. 63).

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[1]Note the implication that degree of decoding automaticity is strictly correlated with comprehension ability. This belief is central to the decoding sufficiency approach to reading comprehension.

The Mathews et al. (1980) approach is noteworthy in that the word is the largest unit of text segmentation; it is typically the smallest unit in comprehension studies. Reader performance on intraword segmentation can be regarded as only an indirect index of reading comprehension ability.

Changes in Reader Behavior

Wiener and Cromer (1967) pointed out that there are two general solutions to the problem of poor organization skills ("response patterns") among readers. The first is to alter texts so that the limited skills possessed by the reader become sufficient for the attainment of comprehension, as discussed in the previous section. The second approach is to alter reader behavior so that the skills and strategies employed are adequate to the task of comprehending unaltered texts. Studies that exemplify the latter approach are considered in this section.

Imagery Instructions

Levin (1973) hypothesized that for certain populations of poor comprehenders the facilitative effect of phrasally grouped text ought to be attainable by having the reader generate an organizational strategy internally. Imagery was selected as the internal mechanism because of its well documented beneficial effects in verbal learning tasks. Fourth-grade good and poor comprehenders were asked to read two 12-sentence stories that were capable of being represented pictorially. Half of the children were instructed to think of a mental picture as

they read each individually presented sentence. The other half were given no imagery instructions. All children answered 13 oral comprehension questions at the end of each passage.

Imagery instructions produced a significant increase in number of correct answers to comprehension questions. This effect was particularly strong among poor comprehenders who fit the "difference" category in the Wiener and Cromer (1967) classification; i.e., poor comprehenders with good basic reading skills, as inferred from vocabulary scores. Such children exhibited a 26% increase in comprehension performance in the imagery condition. Their performance under imagery instructions almost equaled that of good comprehenders. Poor comprehenders in the "deficit" category (low vocabulary knowledge), on the other hand, showed no change across the two reading treatments. This interaction of aptitude and treatment fits the same pattern as that found in Cromer's (1970) study using phrasally grouped text.

Levin (1973) also tested a pictures-only presentation condition. In this treatment, children "read" the two stories by studying 12 sequenced pictures, one per sentence. Performance in the pictures-only condition was not found to be superior to that in the normal reading condition. Since the three conditions were informationally equivalent, this shows that the processing of pictorial and print information and the generation of images are functionally quite different. Reader-generated images require deeper semantic processing of text information, and thus facilitate improved comprehension. Additionally, reader-generated images are more "personal" than presented images

(pictures), and thus may be stronger cues during retrieval of story information from memory (see Thomson & Tulving, 1970).

Modeling Procedures

Several techniques have been used to help developing readers overcome obstacles that prevent skilled reading performance. Providing the reader with a model of skilled performance is one way of helping the reader to understand and practice the behavior he or she is striving to achieve. Although the model may be seen as an aid to mastery of decoding performance--as a resource for identifying difficult words and bringing the child's oral reading up to speed--the emphasis is actually on other aspects of reading; namely, on the development of fluency. Cunningham (1979) put this class of techniques into perspective as follows: "These techniques really teach very few, if any, decoding skills. Rather, they teach the students to put their existing decoding skills on automatic pilot" (p. 424).

Because our interest is in the improvement of comprehension skills, not oral reading fluency, we should pause to examine the relationship between the two. In the introduction we suggested that text organization skills form the basis for ability in reading comprehension. Fluency in oral reading may be an indicator of text organization ability. That is, a person who has the skills to organize a text is likely to read more fluently than a person without such skills. More cogently, it is unreasonable to expect a poor text organizer (i.e., poor comprehender) to read with fluency, as the literature demonstrates (cf., Golinkoff, 1975-76). While development of oral reading fluency

itself may not be tantamount to acquisition of comprehension ability, it must be regarded as a significant step for any developing reader.

Imitative reading. One of the modeling procedures described by Cunningham had been labeled the imitative method (Huey, 1908/1968) years earlier. Chomsky (1976) demonstrated the effectiveness of the imitative method in a nonexperimental study. She identified five third grade poor readers with normal IQ and no apparent speech or language problems. The children were able to decode only slowly, reading texts word by word, without fluency. Each child selected a short book. Using a cassette player and headphones, the children then listened to a prerecorded reading of the story while following along in the printed version and trying to say the words in unison with the recording. The children practiced until they were able to read the stories fluently, with expression, entirely on their own. All children achieved this level of performance after two to four weeks of repeated practice with the same story.

As the children selected successive stories to learn with the aid of the recorded model, the period of time required for criterion solo performance diminished dramatically. By the fourth or fifth book, no child needed more than a week of practice to gain fluency. All the children had demonstrated an ability to read six books fluently and naturally by the end of three months. Furthermore, their attitudes toward reading and images of themselves as readers appeared to change in a positive fashion. They were noticeably relaxed and comfortable while reading, rather than tense and uncertain. The children no longer

avoided reading aloud to others, and some even read quite eagerly, both at school and at home. They were conscientious about engaging in daily practice with the recorded stories, even at home, and extended their reading activity to new, unrecorded books and to other sources such as cereal boxes.

Chomsky (1976) augmented practice in imitative reading with weekly drills in a variety of word identification, writing, and spelling tasks. While the contribution of these support activities to improvements in oral reading fluency is not known, it is instructive that the exercises were conducted using the recorded stories. The children were not exposed to novel, possibly intimidating, materials. They worked with the familiar, building skills that would allow them to more readily transfer their ability in fluency to new materials.

Impress method. A variation on imitative reading involves live modeling of oral reading by the teacher. As described by Cunningham (1979), the child and teacher are seated side by side, sharing a book. The teacher reads aloud at a moderate pace while moving a finger along under the words as they are read. The child reads orally in synchrony with the teacher. Whenever the child encounters difficulty, he or she can let the teacher carry the burden of decoding until composure is regained.

Unlike imitative reading, there is no emphasis on rereading selections until some criterion of performance is attained by the child. In fact, Hollingsworth (1970) stated that the goal of the impress procedure is "to read as many pages of material as time permits without causing physical discomfort" (p. 112). He also instructed that

the teacher should speak directly into the child's ear. "In this method the child's visual, aural, oral, and tactile senses are involved in the reading process" (p. 112). Apparently, proponents of the impress method consider this level of involvement as the key to development of mature reading.

Very little documentation of the effectiveness of the impress method is available. Because the procedure is extremely time-consuming for the teacher, Hollingsworth (1970) presented stories to children using a tape recorder, which changed the procedure to nearly that used in imitative reading. There were some differences, however. Hollingsworth's fourth graders read and listened to each of 30 taped stories only once rather than repeatedly, and the effects of the training were measured by scores on a standard reading text (Gates-MacGinitie) rather than by changes in reading fluency. Hollingsworth's results showed no differences between the training group and an undefined control group on the posttest measures, thus indicating no effect of the impress method when used in this manner.

Rereading

Another variation of the imitative method involves the rereading of a selection until some criterion of performance is attained. Samuels (1979) described the typical procedure, generally called the method of repeated readings: A short, meaningful passage of a text or story is read and reread several times until a prescribed level of fluency is reached. Then the reader goes on to master each

succeeding passage in similar fashion. The teacher continually tests children one by one as they feel ready to perform orally on the current passage.

For Samuels (1979), "fluency" was operationalized to mean an oral reading rate of 85 words per minute. Accuracy of decoding was de-emphasized in performance, for it was felt that a concern for accuracy would impede the reader's fluency development. He likened the repeated readings procedure to that used during the perfection of athletic skill; that is, the process of achieving speed and smoothness. The usual, single reading situation lacks this feature in that performance is never brought up to some criterion before the reader moves on to a new passage.

Samuels (1979) argued that the repeated readings procedure aids comprehension by removing the "decoding barrier" and allowing the reader to focus attention on the meaning of the passage. This is clearly a decoding sufficiency account of comprehension development. Samuels implies that once the decoding barrier is removed, comprehension will quickly and certainly follow.

Research results reported in the Samuels (1979) article are only sketchy. But the author observed that as readers continued to engage in the repeated readings procedure, the rate of speed on the first reading of each new passage decreased, as did the number of readings required for attainment of criterion performance. Both results support the conclusion that new levels of skills proficiency are produced by repeated readings, and that these skills transfer to new readings.

While Samuels (1979) stressed decoding speed as a criterion of performance, other studies have shown that rereading also improves decoding accurancy. Gonzales and Elijah (1975) examined changes in decoding errors over two oral readings of a passage by third graders. They found that although the number of errors was reduced on the second reading, the profile of error categories remained the same. That is, there did not appear to be a particular class of errors that benefitted more than any other from rereading. If increased fluency of oral reading is the eventual result of the rereading procedure, it would be instructive to learn the relationship between error reduction and fluency development across readings. Unfortunately, Gonzales and Elijah did not judge changes in fluency, nor did they relate error changes to reading comprehension. It may turn out that inquiry in this area would provide very useful information about the little understood relationship between decoding and comprehension.

Visual Scan Strategies

The behavioral analog of text manipulations that produce physical organization of print, as in the Cromer (1970) formats, would appear to be some type of visual sampling strategy exercised by the reader. To our knowledge, the training of a strategy specifically designed to influence reading behavior has not been reported in the research literature. However, visual sampling procedures have been studied in other contexts, and the result of one investigation suggests that modification of sampling strategies may have an effect on reading comprehension.

Egeland (1974) examined the effects of two types of training on the match-to-sample ability of second-grade impulsive children. One group was trained to scan the features of choice alternatives, successively eliminating nonmatching geometric figures or nonsense words. The second training group was instructed merely to delay responding for 10-15 seconds--to not respond impulsively. A control group of impulsive children received no training. Primary results were that both training groups exhibited a significant reduction of errors in an immediate match-to-sample posttest. Two months later the scan training group retained its low error performance, but the delay training group showed a significant increase in performance errors.

Of particular interest to the present inquiry is that among the three groups, differences emerged in pretest to posttest performance in reading comprehension. Scores on the comprehension component of the Gates-MacGinitie Reading Test significantly improved for the scan training group, but not for the delay training group. Nothing in the training procedures themselves offers a ready account for this outcome. How would a scanning strategy that evolved in match-to-sample tasks transfer to improved understanding of text meaning? One explanation is that the groups comprehended the test passages equally well, but that the scan group was better able to eliminate incorrect answers in the multiple-choice answer format.

Autogenic Relaxation Training

A more general strategy training program was reported by Frey (1980). He divided 30 matched pairs of third through sixth grade

reading disabled children into two groups. The control group received one hour weekly of extracurricular training in a reading program. The experimental group trained on the same reading program, but in addition devoted the first 15 minutes of each weekly session to autogenic training. The purpose of the autogenic training was to induce a relaxed atmosphere in which children could develop a reflective, receptive attitude toward reading. Using procedures modeled after the progressive relaxation exercises of Jacobson (1938), the children were trained to relax themselves by autosuggestion. Training was gradually extended to self-generated rules for literate activities; e.g., "First think, then write." By verbalizing such self-commands, the children imposed processing strategies on themselves, which is the same procedure used by Egeland's (1974) scan training group.

At the end of one year's training the experimental group made significantly fewer reading and spelling errors than the control group. Since the reading measures were apparently based on word identification tasks, it is difficult to assess the relevance of autogenic training to comprehension skills development. But since self-verbalization has been used successfully in the training of both cognitive (Egeland, 1974) and motor (Meichenbaum, 1977) skills, there is good reason to believe that this general class of procedures should be effective in comprehension skills training also. The key to the use of autogenic procedures is the identification of appropriate dimensions of cognitive behavior that the reader must attend to, as exemplified in Meichenbaum (1977). To our knowledge, no one has yet identified such dimensions for reading comprehension.

Cloze Procedure

In a cloze task the reader is asked to supply words that have been omitted from a passage. The criterion for successful performance is that the resulting text makes sense. The basis for successful performance, therefore, is comprehension of the passage. In fact, the most common application of cloze procedures is in the assessment of comprehension ability. Results of cloze tests have been found to correlate highly with more traditional measures of reading comprehension (e.g., Bormuth, 1967; Potter, 1968).

Because of its concurrent validity as a measure of comprehension ability, the cloze procedure has been examined by educators for its potential as an instructional device. The cloze task is viewed as a problem-solving situation in which the reader tries to comprehend as much of the available text as possible so as to guess well on the missing words. The instructional extension is that training on such tasks might serve to stimulate the exercise and development of comprehension operations in the reader. This would appear to be an especially reasonable instructional approach with children who exhibit no particular deficits in basic skills but whose comprehension of text remains low--i.e., difference poor readers.

Kennedy and Weener (1973) examined the effects of visual and auditory cloze training on reading and listening comprehension with third graders. All participants were below grade level in reading as measured by standardized tests. They were assigned randomly to one of

four training conditions: visual cloze training, auditory cloze training, oral reading practice, and regular classwork.

Posttests were conducted using the Durrell Listening-Reading Series. Both cloze training groups performed better than control subjects on listening subtests. On reading subtests, however, only the visual cloze group excelled. In addition, visual cloze training resulted in significantly better performance on reading than listening subtests.

On posttests involving cloze tasks, both cloze training groups were superior to the control groups in both cloze modes. But there were no differences between the two experimental groups across the two cloze tests. That is, cloze training in either input modality generalized to performance on the other modality during posttesting.

The authors concluded that cloze training was effective in improving reading comprehension skills. It appears to be a useful instructional strategy for helping poor comprehenders to develop text organization skills. But very little research on the topic appears to exist. In the absence of definitive studies, the instructional potential of cloze procedures remains unknown.

Conclusions

The studies reviewed here provide evidence for the importance of text organization in reading comprehension. Organization resides within the semantic-syntactic rules that govern the linearization of words into sentences and the composition of sentences into coherent discourse. However, it is possible for a listener or reader to focus

attention on aspects of the discourse other than those that convey organizational information, such as the decoding of individual words, and thus miss the message of the text. The comprehender must remain attuned to those features of the message that give organization to the flow of lexical and other units of semantic information.

Attending to organizational features is made easy during listening because so many cues are presented in the physical message itself. The speaker uses pitch, stress, and timing to "package" the content of the message for the audience. The listener can hardly avoid the influence of such cues during processing of the message. Without such cues, the demands of organizing linear, nonrepeated, oral text would make listening comprehension very difficult. The comprehension of machine-generated, synthetic speech is a case in point.

Printed text contains fewer organizational cues than speech. Words in print are presented in uniform fashion, and the spatial shifts that occur at the end of a line of print are usually arbitrary. If anything, they interfere with rather than enhance the semantic organization of the text (Frase & Schwartz, 1979). This places a greater demand on the reader's semantic analysis skills, since perceptual cues are unavailable or misleading.

The present review shows the promise of several different approaches to the training of comprehension skills. We have focused on techniques designed to improve the reader's awareness of and sensitivity to text organization. Two training options have emerged. First, the text can be physically rearranged so as to present the message to

the reader in a preorganized format. Vertical phrasal segmentation is one text format that could be an effective preorganizer for the reader. The second option is to instruct the reader to engage in processing operations that impose organization upon normally formatted text. Visual imagery and operations designed to promote fluency in text processing are viewed as effective devices for the achievement of reader-generated text organization. Research on both of these training strategies should yield useful information about the organizational requirements of effective reading.

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